

screw receiving holes are oriented in said plate to overlie the anterior aspect of the second cervical vertebral body. ¹¹²

⁸⁴ (Amended) The plate system of claim ¹¹² ~~639~~, wherein at least two of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of a single cervical vertebral body adjacent a disc space to be fused.

⁸⁴ (Amended) The plate system of claim ¹¹² ~~639~~, in combination with a fusion promoting substance.

⁸⁷ (Amended) The plate system of claim ¹¹⁵ ~~644~~, wherein said fusion promoting substance is at least in part other than bone.

⁸⁷ (Amended) The plate system of claim ¹¹⁵ ~~644~~, wherein said fusion promoting substance comprises bone morphogenetic protein.

⁸⁴ (Amended) The plate system of claim ¹¹² ~~639~~, in combination with a bioresorbable material.

REMARKS

Prior to Examination, Applicant cancelled claims 540, 554, 559, 582, 587, 605, 612-620, 623, 631, 632, 640, and 641, and amended claims 538, 539, 541-553, 555-558, 560-566, 570, 574, 575, 585, 586, 594, 596, 603, 604, 621, 622, 624-630, 633-639, and 642-647 to further define applicant's claimed invention. It is respectfully requested that this Amendment be entered and the claims allowed.

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If there are any fees due in connection with the filing of this Amendment, please charge the fee to our Deposit Account 50-1066.

Respectfully submitted,

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CHANGES TO THE CLAIMS

538. (Amended) A plate system adapted for use in the anterior human cervical spine for contacting the anterior aspect of at least two cervical vertebral bodies, said plate system comprising:

a plate having a longitudinal axis and a length sufficient to span at least two cervical vertebral bodies, a lower surface for [contacting] placement against the cervical vertebral bodies, said lower surface being concave along a substantial portion of the longitudinal axis of said plate,
and an upper surface opposite said lower surface;

at least two bone screws each having a central longitudinal axis and being adapted to engage each of the at least two cervical vertebral bodies, respectively, each of said bone screws having a leading end for insertion into the bone of the cervical vertebral bodies and a trailing end opposite said leading end, said trailing end having a top surface oriented toward said trailing end of said bone screw and a bottom surface opposite said top surface oriented toward said leading end of said bone screw;

at least two bone screw receiving holes extending through said plate from said upper surface through said lower surface, at least a first of said bone screw receiving holes associated with a first of the cervical vertebral bodies and at least a second of said bone screw receiving holes associated with a second of the cervical vertebral bodies [each of said bone screw receiving holes being adapted to receive a bone screw for

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engaging each of the at least two cervical vertebral bodies to attach said plate to the cervical spine]; and

a locking element adapted to lock to said plate only a single one of said bone screws [only a single bone screw] inserted in a single one of said at least two bone screw receiving holes, said locking element adapted to be coupled to said plate prior to the insertion of [the] said bone screw to be locked by said locking element into said one of said bone screw receiving [hole] holes, said locking element being moveable from an initial position that permits the insertion of [the] said bone screw into said one of said bone screw receiving [hole] holes to a final position that is adapted to extend over at least a portion of [the] said top surface of said bone screw inserted in said one of said bone screw receiving holes [to retain the bone screw to said plate].

539. (Amended) The plate system of claim 538, [further comprising at least one bone screw having a leading end for insertion into the cervical spine and a trailing end opposite said leading end,] wherein said top surface of said trailing end [including a surface] of said bone screw is generally transverse to [a] the longitudinal axis of said bone screw, said locking element contacting said [generally transverse] top surface of said bone screw when in said final position.

541. (Amended) The plate system of claim [540] 539, wherein said locking element is adapted to be removably coupled to said plate.

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542. (Amended) The plate system of claim 538, wherein said locking element in the final position covers at least a portion only one of said bone screw receiving holes.
543. (Amended) The plate system of claim 538, wherein said locking element is adapted to be rotated from the initial position to the final position.
544. (Amended) The plate system of claim 543, wherein less than a full rotation of said locking element rotates said locking element from the initial position to the final position.
545. (Amended) The plate system of claim 538, wherein at least a portion of said locking element slides from the initial position to the final position.
546. (Amended) The plate system of claim 545, wherein said locking element slides over at least a portion of only one of said bone screw receiving holes.
547. (Amended) The plate system of claim 545, wherein said locking element slides over at least a portion of one of [the] said bone screws when in said one of said bone screw receiving holes.
548. (Amended) The plate system of claim 538, wherein said locking element comprises at least one of a screw, a rivet, and a cap.
549. (Amended) The plate system of claim 538, wherein said locking element includes a generally circular head having at least one cut-out segment.
550. (Amended) The plate system of claim 538, wherein said locking element comprises at least one of a camming surface, a ramped surface, and a threaded portion.

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551. (Amended) The plate system of claim 538, wherein said locking element has a low profile so as to not interfere with overlying tissues and adjacent vessels and neurological structures when said locking element is in the final position.
552. (Amended) The plate system of claim 538, wherein at least one end of said plate is configured to cooperatively engage a compression tool for movement of at least one vertebral body toward another vertebral body during installation of said plate.
553. (Amended) The plate system of claim 538, further comprising an access opening in said plate for accessing at least one vertebral body with a compression tool for movement of at least one vertebral body toward another vertebral body during installation of said plate.
555. (Amended) The plate system of claim 538, wherein at least a portion of said lower surface is roughened to promote the growth of bone along said lower surface.
556. (Amended) The plate system of claim 538, wherein at least one of said bone screw receiving holes is configured to form an interference fit with [a properly dimensioned] one of said bone [screw to be received therein] screws.
557. (Amended) The plate system of claim 538, wherein at least a first pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the first cervical vertebral body [adjacent a disc space to be fused] and at least a second pair of said bone screw receiving

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holes are oriented in said plate to overlie the anterior aspect of [a] the second cervical vertebral body [adjacent the disc space to be fused].

558. (Amended) The plate system of claim[s] 557, wherein said bone screw receiving holes of at least one of said first and second pairs of bone screw receiving holes are generally arranged in side-by-side pairs.
560. (Amended) The plate system of claim 538, wherein at least two of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of a single cervical vertebral body adjacent a disc space to be fused.
561. (Amended) The plate system of claim 538, in combination with a fusion promoting substance.
562. (Amended) The plate system of claim 561, wherein said fusion promoting substance is at least in part other than bone.
563. (Amended) The plate system of claim 561, wherein said fusion promoting substance comprises bone morphogenetic protein.
564. (Amended) The plate system of claim 538, [further comprising bone screws for engaging said plate to the cervical spine,] wherein at least a portion of one of said plate, said locking element, and said bone screws is a bioresorbable material.
565. (Amended) The plate system of claim 564, wherein said bioresorbable material is at least in part bone.

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566. (Amended) A plate adapted for use in the anterior human cervical spine for contacting the anterior aspect of at least two cervical vertebral bodies, said plate comprising:

a longitudinal axis and a length sufficient to span at least two cervical vertebral bodies, a lower surface for [contacting] placement against the cervical vertebral bodies, said lower surface being concave along a substantial portion of the longitudinal axis of said plate, and an upper surface opposite said lower surface;

at least two bone screw receiving holes extending through said plate from said upper surface through said lower surface, at least a first of said bone screw receiving holes associated with a first of the cervical vertebral bodies and at least a second of said bone screw receiving holes associated with a second of the cervical vertebral bodies, each of said bone screw receiving holes being adapted to receive a single bone screw [for engaging each of the at least two cervical vertebral bodies] to attach said plate to the cervical spine; and

a locking element adapted to lock to said plate only a single bone screw inserted in one of said at least two bone screw receiving holes, said locking element adapted to be coupled to said plate prior to the insertion of the bone screw to be locked by said locking element into said bone screw receiving hole, said locking element being moveable from an initial position that permits the insertion of [the] said bone screw into said one of said bone screw receiving [hole] holes to a final position that is adapted to

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extend over at least a portion of said one of said bone screw receiving
[hole] holes into which the single bone screw is to be inserted.

570. (Amended) The plate of claim 566, wherein said locking element in the final position covers at least a portion of only one of said bone screw receiving holes.
574. (Amended) The plate of claim 573, wherein said locking element slides over at least a portion of only one of said bone screw receiving holes.
575. (Amended) The plate of claim 573, wherein said locking element slides over at least a portion of one of the bone screws when in one of said bone screw receiving holes.
585. (Amended) The plate of claim 566, wherein at least a first pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the first cervical vertebral body [adjacent a disc space to be fused] and at least a second pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the second cervical vertebral body [adjacent the disc space to be fused].
586. (Amended) The plate of claim[s] 585, wherein said bone screw receiving holes of at least one of said first and second pairs of bone screw receiving holes are generally arranged in side-by-side pairs.
594. (Amended) A plate adapted for use in the anterior human cervical spine for contacting the anterior aspect of at least two cervical vertebral bodies, said plate comprising:

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a longitudinal axis and a length sufficient to span at least two cervical vertebral bodies, a lower surface for [contacting] placement against the cervical vertebral bodies, said lower surface being concave along a substantial portion of the longitudinal axis of said plate, and an upper surface opposite said lower surface;

at least two bone screw receiving holes extending through said plate from said upper surface through said lower surface, at least a first of said bone screw receiving holes associated with a first of the cervical vertebral bodies and at least a second of said bone screw receiving holes associated with a second of the cervical vertebral bodies, each of said bone screw receiving holes being adapted to receive a single bone screw [for engaging each of the at least two cervical vertebral bodies] to attach said plate to the cervical spine; and

said plate having a non-detachable locking portion adapted to lock to said plate only a single bone screw inserted in one of said at least two bone screw receiving holes, said locking portion being moveable from an initial position that permits the insertion of the bone screw to be locked by said locking element into said one of said bone screw receiving [hole] holes to a final position that is adapted to extend over at least a portion of [the] said one of said bone screw [hole] receiving holes to retain the bone screw to said plate.

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596. (Amended) The plate of claim 594, wherein said locking portion in the final position covers at least a portion of only one of said bone screw receiving holes.
603. (Amended) The plate of claim 594, wherein at least a first pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the first cervical vertebral body [adjacent a disc space to be fused] and at least a second pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the second cervical vertebral body [adjacent the disc space to be fused].
604. (Amended) The plate of claim[s] 603, wherein said bone screw receiving holes of at least one of said first and second pairs of bone screw receiving holes are generally arranged in side-by-side pairs.
621. (Amended) A plate system adapted for use in the anterior human cervical spine for contacting the anterior aspect of at least two cervical vertebral bodies, said plate system comprising:
- a plate having a longitudinal axis and a length sufficient to span at least two cervical vertebral bodies, a lower surface for [contacting] placement against the cervical vertebral bodies, said lower surface being concave along a substantial portion of the longitudinal axis of said plate,
and an upper surface opposite said lower surface;
- at least two bone screws each having a central longitudinal axis and being adapted to engage each of the at least two cervical vertebral bodies, respectively, each of said bone screws having a leading end for insertion

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into the cervical spine and a trailing end opposite said leading end, at least one of said bone screws including proximate said trailing end a contact surface area generally transverse to the central longitudinal axis of said bone screw;

at least two bone screw receiving holes extending through said plate from said upper surface through said lower surface, at least a first of said bone screw receiving holes associated with a first of the cervical vertebral bodies and at least a second of said bone screw receiving holes associated with a second of the cervical vertebral bodies, each of said bone screw receiving holes having a central longitudinal axis and being adapted to receive one of said bone screws to attach said plate to the cervical spine; and

a locking element adapted to lock to said plate only one of said bone screws inserted in one of said bone screw receiving holes, said locking element contacting said generally transverse contact surface area [of a respective one] of said one of said bone screws so as to retain said [respective] one of said bone screws to said plate.

622. (Amended) The plate system of claim 621, wherein said locking element is configured to threadably engage one of said bone screw receiving holes.

624. (Amended) The plate system of claim 621, wherein at least a first pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the first cervical vertebral body [adjacent a disc

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space to be fused] and at least a second pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the second cervical vertebral body [adjacent the disc space to be fused].

625. (Amended) The plate system of claim 621, wherein at least two of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of a single cervical vertebral body adjacent a disc space to be fused.
626. (Amended) The plate system of claim 621, in combination with a fusion promoting substance.
627. (Amended) The plate system of claim 626, wherein said fusion promoting substance is at least in part other than bone.
628. (Amended) The plate system of claim 626, wherein said fusion promoting substance comprises bone morphogenetic protein.
629. (Amended) The plate system of claim 621, in combination with a bioresorbable material.
630. (Amended) A plate system adapted for use in the anterior human cervical spine for contacting the anterior aspect of at least two cervical vertebral bodies, said plate system comprising:
- a plate having a longitudinal axis and a length sufficient to span at least two cervical vertebral bodies, a lower surface for [contacting] placement against the cervical vertebral bodies, said lower surface being concave along a substantial portion of the longitudinal axis of said plate,
and an upper surface opposite said lower surface;

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at least two bone screws each having a central longitudinal axis and being adapted to engage each of the at least two cervical vertebral bodies, respectively, each of said bone screws having a leading end for insertion into the cervical spine and a trailing end opposite said leading end, at least one of said bone screws including proximate said trailing end a maximum cross sectional dimension transverse to the central longitudinal axis of said bone screw, said bone screw having a contact surface area at the maximum cross sectional dimension;

at least two bone screw receiving holes extending through said plate from said upper surface through said lower surface, at least a first of said bone screw receiving holes associated with a first of the cervical vertebral bodies and at least a second of said bone screw receiving holes associated with a second of the cervical vertebral bodies, each of said bone screw receiving holes having a central longitudinal axis and being adapted to receive one of said bone screws to attach said plate to the cervical spine; and

a locking element adapted to lock to said plate only one of said bone screws inserted in one of said bone screw receiving holes, said locking element adapted to [engage a respective one of said bone screw receiving holes and to] contact said contact surface area of [a respective] said one of said bone screws so as to retain said [respective] one of said bone screws to said plate.

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633. (Amended) The plate system of claim 630, wherein at least a first pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the first cervical vertebral body [adjacent a disc space to be fused] and at least a second pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the second cervical vertebral body [adjacent the disc space to be fused].
634. (Amended) The plate system of claim 630, wherein at least two of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of a single cervical vertebral body adjacent a disc space to be fused.
635. (Amended) The plate system of claim 630, in combination with a fusion promoting substance.
636. (Amended) The plate system of claim 635, wherein said fusion promoting substance is at least in part other than bone.
637. (Amended) The plate system of claim 635, wherein said fusion promoting substance comprises bone morphogenetic protein.
638. (Amended) The plate system of claim 630, in combination with a bioresorbable material.
639. (Amended) A plate system adapted for use in the anterior human cervical spine for contacting the anterior aspect of at least two cervical vertebral bodies, said plate system comprising:
a plate having a longitudinal axis and a length sufficient to span at least two cervical vertebral bodies, a lower surface for [contacting]

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placement against the cervical vertebral bodies, said lower surface being concave along a substantial portion of the longitudinal axis of said plate,
and an upper surface opposite said lower surface;

at least two bone screws each having a central longitudinal axis and being adapted to engage each of the at least two cervical vertebral bodies, respectively, each of said bone screws having a leading end for insertion into the cervical spine and a trailing end opposite said leading end, said trailing end including a lower surface generally transverse to the central longitudinal axis of said screw;

at least two bone screw receiving holes extending through said plate from said upper surface through said lower surface, at least a first of said bone screw receiving holes associated with a first of the cervical vertebral bodies and at least a second of said bone screw receiving holes associated with a second of the cervical vertebral bodies, each of said bone screw receiving holes [having a reduced dimension proximate said lower surface of said plate to form] has a seat, said seat having a [substantially planar] surface being at least in part flat and adapted to contact said lower surface of one of said bone screws; and
a locking element adapted to lock to said plate only one of said bone screws inserted in one of said at least two bone screw receiving holes, said locking element contacting at least a portion of said one of said bone [screw] screws so as to retain [a respective] said one of said bone screws to said plate.

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642. (Amended) The plate system of claim 639, wherein at least a first pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the first cervical vertebral body [adjacent a disc space to be fused] and at least a second pair of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of [a] the second cervical vertebral body [adjacent the disc space to be fused].
643. (Amended) The plate system of claim 639, wherein at least two of said bone screw receiving holes are oriented in said plate to overlie the anterior aspect of a single cervical vertebral body adjacent a disc space to be fused.
644. (Amended) The plate system of claim 639, in combination with a fusion promoting substance.
645. (Amended) The plate system of claim 644, wherein said fusion promoting substance is at least in part other than bone.
646. (Amended) The plate system of claim 644, wherein said fusion promoting substance comprises bone morphogenetic protein.
647. (Amended) The plate system of claim 639, in combination with a bioresorbable material.